ITOFINISH LJSYF NEW

CHITOSAN BASED ANTIBACTERIAL FINISHING AGENT

SUMMARY

Itofinish LJSYF New is a chitosan based antibacterial finishing agent that is exceptionally kind to the skin and can be used to combat a number of skin ailments associated with bacterial infections and drying of the skin.

CHITOSAN – A NATURAL SKIN CARE PRODUCT

Chitosan is a natural product found in abundance in the shells of crustacean, such as crabs, lobsters and prawns. Chitosan is extremely safe and non-toxic. Chitosan films interact comfortably with the human body and experiments have shown that chitosan achieves the same or even greater effects than antibiotics against suppuration caused by antibacterial infection.

Chitosan is produced commercially by deacetylation of chitin, which is the structural elemet in the exoskeleton of crustaceans (crabs, shrimp, etc.).

Chitosan has many positive properties including, anti-microbial activity, bio-compatibility, low-allergen, high moisture retention and is completely harmless to humans.

ANTIBACTERIAL PROPERTIES

Chitosan's antibacterial properties arise as the chitosan molecule has a strong electrostatic attraction to bacteria. This causes bacterium to become stuck to the chitosan molecule.

MOISTURE RETENTION

Chitosan has been shown to help increase the rate of moisture adsorption/retention of treated fabrics. Sufferers of atopic disease suffer a loss in epidermal moisture that can be as low as 20% of the value of a healthy person. Chitosan helps to counter this and helps relieve these atopic diseases.

SAFETY

Chitosan has been extensively tested and passes toxicity tests such as Ames test, Acute oral test, Subacute test, Chronic test, Pyrogen test, Hemolysis test and allergy tests. The following table highlights testing that has been performed.

TEST RESULTS

There has been a substantial amount of testing done on both Chitosan and Itofinish LJSYF New to show that it is both anti-bacterial and kind to the skin.

Skin Patch testing

Tests were performed using fabrics treated with Itofinish LJSYF New, including its binder and catalyst, on a group of 50 patients undergoing routine diagnostic patch testing for eczematous conditions. All patients in the test group were negative to the fabrics over both two and four day periods, proving the finish and its binder and catalyst to be safe in contact to the skin.

Evaluation of Chitosan in Atopic dermititus.

Clinical evaluation of chitosan treated fabrics was performed over three weeks in 48 patients with myopic dermatitis. Of the 48 patients 33 patients showed an improvement and of these 33, 8 showed a very high improvement in the atopic dermatitis. This gave a usefulness ratio of 66.7% indicating 2 out of 3 patients saw a significant improvement in their conditions. When ratings of slight improvement are considered 97.8 of test subjects felt the chitosan was useful and helped their conditions.

Severity of symptoms	Number (%) at Initial visit	Number (%) at initiation of clinical study	Number (%) in continued wearer study
Severe Moderate Mild Cured	42.5 50.0 7.5 0	20 47.5 32.5 0	0 2.5 92.5 5.0

After trials there were no patients exhibiting sever symptoms and only 2.5% of the patients showed

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Moderate symptoms. None of the patients showed worsening of symptoms due to wearing the chitosan fabric.

Antibacterial results

Chitosan treated fabrics tested in antibacterial tests against methicillin Resistant Staphylococcus aureus (MRSA) showed a reduction value of 99.8% in the number of bacteria present showing that the Chitosan is not only extremely effective antibacterial agent but also is effective against resistant strains such as MRSA.

1) Institute of public health (Japan)

The following results show the effectiveness of Chitosan when used as an antibacterial agent against MRSA and where performed by the institute of public health in Japan and evaluated using the colony count method of the association of antibacterial treatment for textile, Japan.

Culture Time (after inoculation)	Number of viable MRSA strains (CFU/ml)		
	Sample A	Sample B	Control
Immediately			1.94 x 10
18 Hours	1.00 x 10o	0.67 x 10o	1.93 x 10o
Reduction ratio	99.95%	99.97%	-----

2) Kitasato Environmental Science centre.

Fabrics treated with chitosan where tested for antibacterial effect against MRSA after 10 launderings. The results obtained showed that two treated fabrics showed 98.9 – 99.3% reduction within only 3 hours of incubation of the fabrics.

Culture Time	Number of MRSA strains (% reduction)		
	Sample A	Sample B	Control
3 hours	99.3%	98.9%	727% increase

*Evaluated using the colony count method of the association of antibacterial treatment for textile, Japan.

3) Osaka Kaisei Hospital

Fabrics treated with chitosan where tested for antibacterial effect against MRSA and were shown to give 99.8% of growth inhibition 6 hours after contact with MRSA.

Culture Time	Number of MRSA strains	(% reduction)
	Sample	Control
6 hours	99.8%	54520% increase

*Evaluated using the colony count method of the association of antibacterial treatment for textile, Japan

CONCLUSION:

Many different organisations and test houses have done testing on chitosan and chitin based products testing for both antibacterial effect and the benefit to skin. The results of these conclude that chitosan is both an extremely effective antibacterial agent and aids in skin healing through its antibacterial effect and its moisture retention properties.

LJ Specialities has conducted many different tests using Itofinish LJSYF New and has found it to be extremely effective in its capacity as an antibacterial agent through testing to both AATCC 147 and JIS 1902 testing methods. These antibacterial effects have also shown to be extremely durable, if applied correctly with recommended binders and catalysts, obtaining good results after 50 launderings on many separate occasions.

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